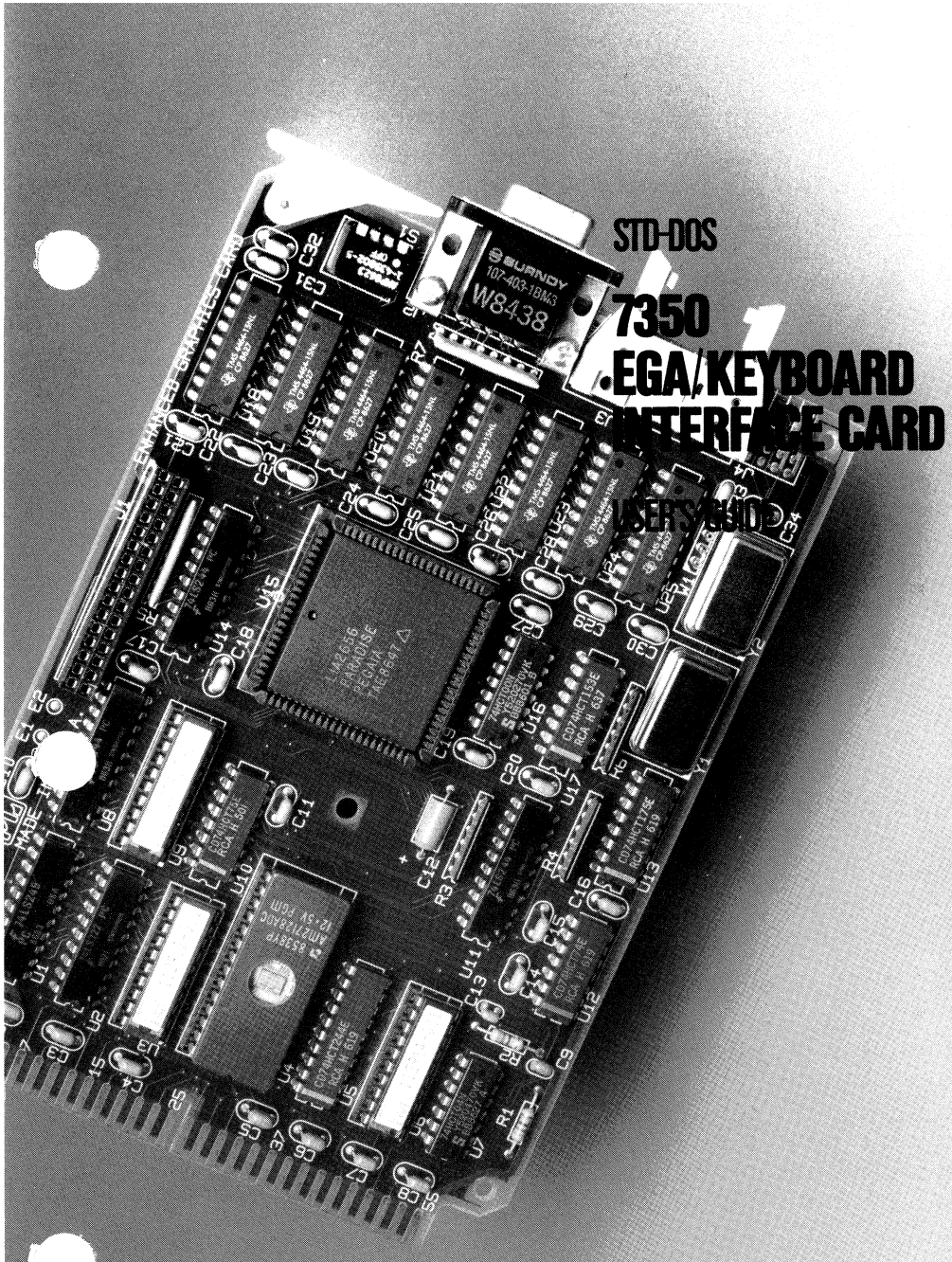

STD-DOS

7350 EGA/KEYBOARD INTERFACE CARD

USER'S GUIDE

PRO-LOG® CORPORATION

112910-001A 500 2/87

FOREWORD

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REFERENCES/BIBLIOGRAPHY

PEGA 1A Application Note Number 38304, Paradise Systems, Inc., 217 East Grand Avenue, South San Francisco, CA 94080

Programmer's Guide to the IBM PC, Peter Norton, Microsoft Press

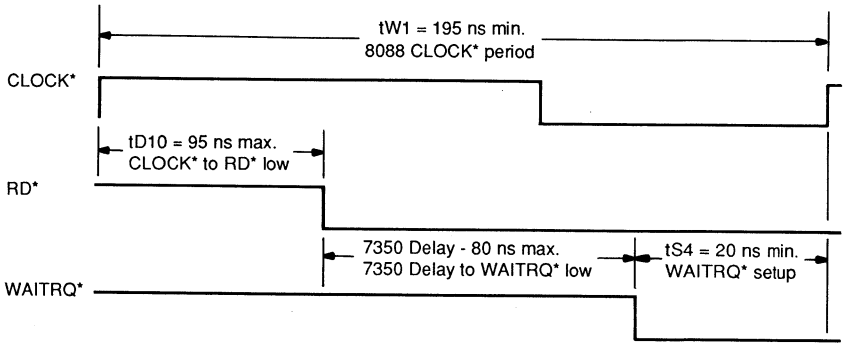
STD-DOS

7350 EGA/KEYBOARD INTERFACE CARD

USER'S GUIDE ADDENDUM

The 7350 EGA/Keyboard STD BUS Card meets worse-case timing for all Pro-Log 8088 CPU cards. The 7350 also meets the STD-8088 Bus Specification with one exception: When using other than a Pro-Log 8088 CPU, the tS4 WAITRQ* Setup Time parameter must be checked for compatibility.

The 7350 tS4 minimum (WAITRQ* low setup to CLOCK*) is 20 ns. The STD-8088 Bus Specification tS4 minimum is 45 ns.



RD* to WAITRQ* low

tW1	min.	(8088 CLOCK* period min.)	195 ns min.
tD10	min.	(Delay from CLOCK* to RD* low)	95 ns max.
		(7350 RD* Delay to WAITRQ* low	80 ns max.
tS4	min.	(WAITRQ* low setup to CLOCK*)	20 ns min.

When either the CPU CLOCK* period is increased or the Delay from RD* low is reduced, the difference in timing can be applied to the WAITRQ* Setup Time, tS4. This timing analysis also applies to WR* timing.

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113186-001 3/87

CONTENTS

Page

Section 1. Introduction and Installation **1-1**

1.1 Introduction **1-1**

1.2 Features **1-1**

1.3 Installation **1-2**
1.3.1 Switch Settings 1-2
1.3.2 Jumpers 1-3
1.3.3 Installation Instructions 1-3

1.4 Operation **1-5**

Section 2. Technical Reference **2-1**

2.1 Specifications **2-1**
2.1.1 Electrical Specification 2-1
2.1.2 Mechanical Specification 2-1
2.1.3 Environmental Specification 2-1
2.1.4 Reliability Specification 2-2
2.1.5 Timing Specification 2-2

2.2 Software Reference **2-3**
2.2.1 7350 Initialization 2-3
2.2.2 Video Interrupt, 10 Hex 2-3
2.2.3 Keyboard Interrupt, 16 Hex 2-15
2.2.4 BIOS Memory Requirements 2-17

2.3 Hardware Reference **2-18**
2.3.1 Hardware Description 2-18
2.3.2 Monitor Interface 2-18
2.3.3 Keyboard Interface 2-18
2.3.4 Interrupt Interconnect 2-19
2.3.5 Feature Connector 2-19
2.3.6 DIN Interface Adapter 2-20
2.3.7 Port Mapping 2-20
2.3.8 Video Memory 2-21
2.3.9 BIOS Extension PROM 2-21
2.3.10 Reference Drawings 2-21

Section 1

INTRODUCTION AND INSTALLATION

1.1 INTRODUCTION

The 7350 EGA/Keyboard Interface card is an IBM/MS-DOS-compatible graphics display card with keyboard interface for the STD BUS. This card is designed for use as an option in Pro-Log's STD-DOS systems. A fully integrated graphics controller chip (Paradise Inc.'s PEGA 1A) has been used for full IBM Enhanced Graphics Adapter (EGA), Color Graphics Adapter (CGA), and Monochrome Display Adapter (MDA) compatiblity.

This card also features a BIOS extension, an IBM-compatible feature connector, an IBM-compatible keyboard interface, and 256K of onboard video memory. Because of the BIOS extension, no installation software is required. Just plug it into the STD-DOS system and the card installs itself at reset or power-up.

1.2 FEATURES

* 100% compatible with IBM EGA/CGA/MDA Monitors
* Monochrome color simulation (16 shades of grey)
* Up to 16 colors of a 64-color palette
* IBM-compatible keyboard interface
* 256K of onboard video memory
* 5-year parts and labor warranty
* MTBF greater than 30 years

1.3 INSTALLATION

1.3.1 Switch Settings

Monitor Selection Switch (SW1)

The monitor selection switch selects the type of display. Figure 1-1 shows the location of SW1.

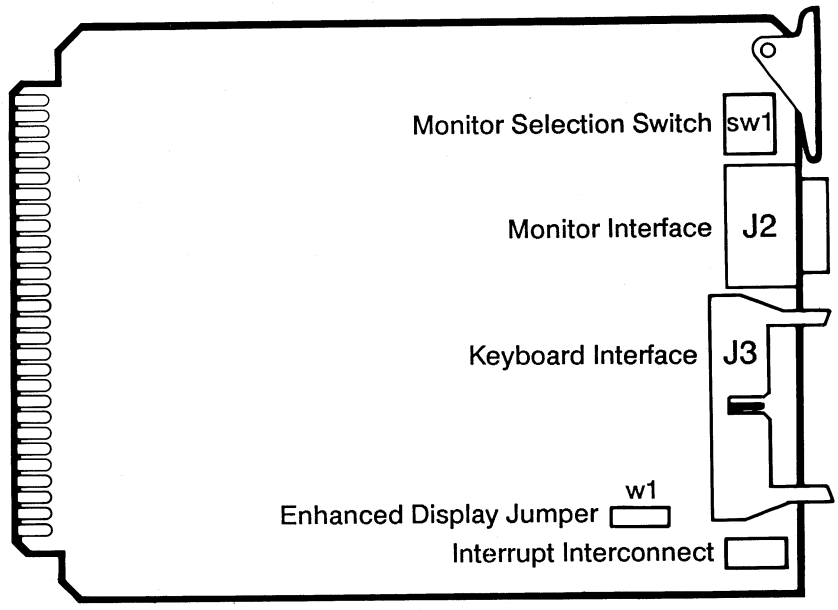


Figure 1-1. 7350 Card Layout

Monitor Selection Table

DISPLAY	SW1-1	SW1-2	SW1-3	SW1-4
Monochrome	OFF	OFF	ON	OFF
Standard RGB 320x200	ON	OFF	OFF	ON
Standard RGB 640x200	OFF	OFF	OFF	ON
Enhanced RGB 640x200	ON	ON	ON	OFF
Enhanced RGB 640x350	OFF	ON	ON	OFF

NOTE: Closed = OFF.

NOTE: Color simulation of 16 shades on a monochrome display can be selected by setting the switches for the enhanced RGB 640x200 display mode and using a monochrome display.

WARNING: CRT damage may result from invalid switch settings.

1.3.2 Jumpers

Enhanced Display Jumper (W1)

The enhanced color jumper selects an enhanced color display.

	ENHANCED COLOR	COLOR MONOCHROME
W1	1 & 2	2 & 3

1.3.3 Installation Instructions

(1) Set the SW1 switches and the W1 jumper for the appropriate monitor type. Refer to Sections 1.3.1 and 1.3.2 for settings.

(2) Ensure that system power is OFF.

(3) Loosen the two thumb screws on the card rack retaining bar (see Figure 1-2).

(4) Move the retaining bar to the UP position (see Figure 1-2).

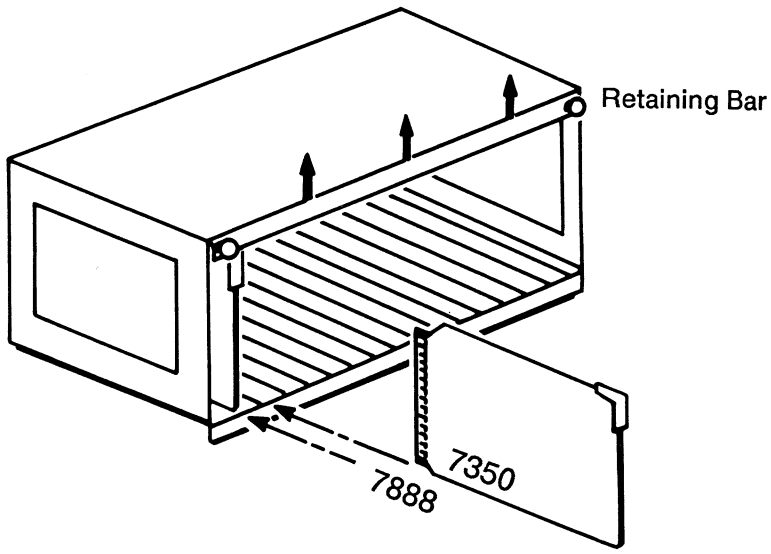


Figure 1-2. Card Installation

(5) Install the 7350 into the card rack (see Figure 1-2).

(6) Install the Interrupt Interconnect cable between J3 of the 7888 CPU card and J4 on the 7350 EGA card (see Figure 1-3).

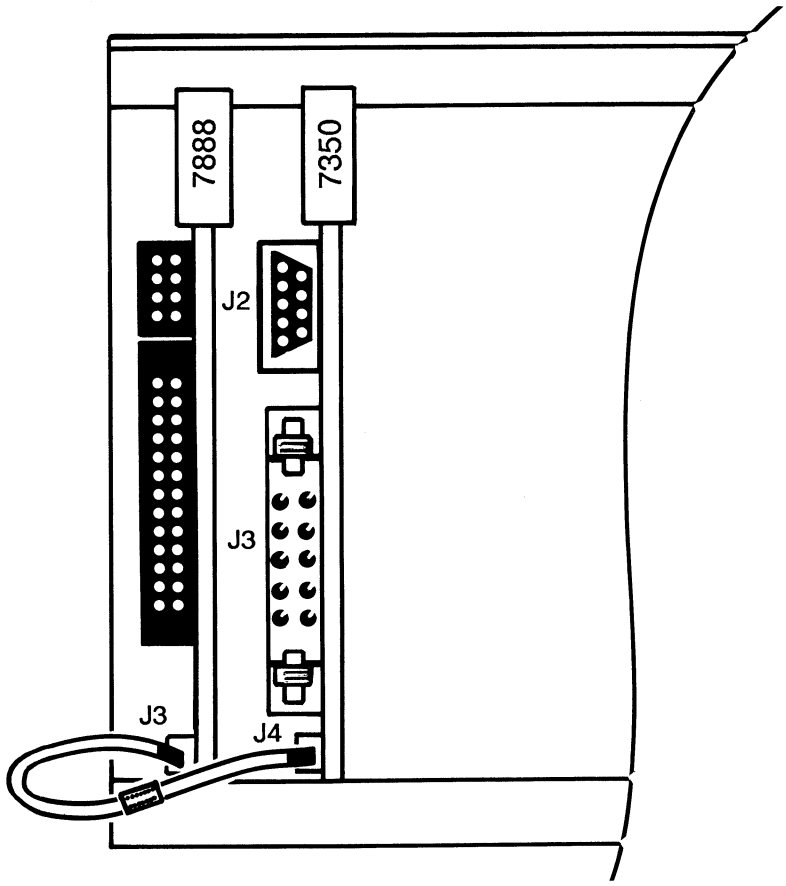


Figure 1-3. Interrupt Interconnect Hookup

(7) Connect the monitor to the 9-pin D connector, J2 (see Figure 1-4).

(8) Connect the keyboard to the 10-pin transition connector, J3 (see Figure 1-4), using the DIN Interface Adapter supplied with the 7350 card.

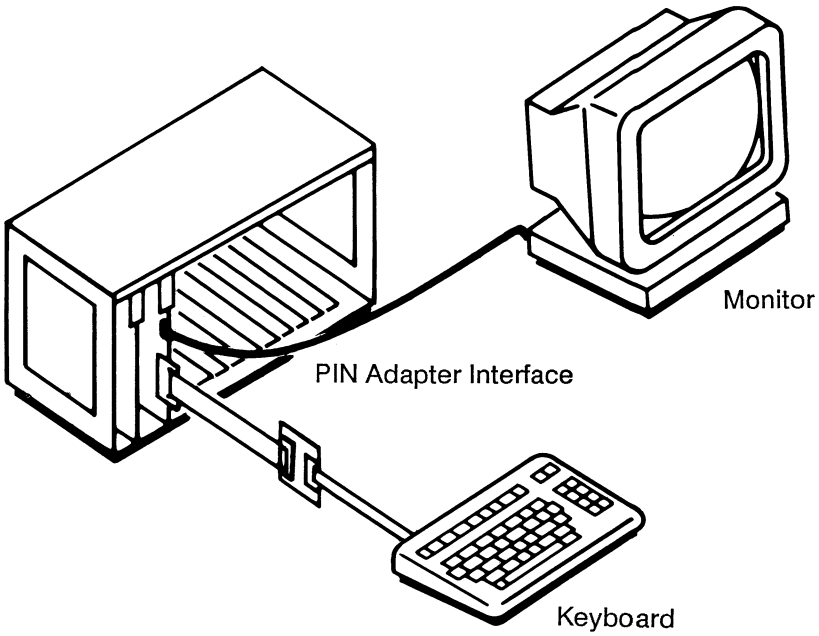


Figure 1-4. Monitor and Keyboard Hookup

1.4 OPERATION

The 7350 EGA/Keyboard Interface card works with IBM -compatible graphics software when used in Pro-Log's STD-DOS systems.

Section 2

TECHNICAL REFERENCE

NOTE: This section is for Reference only. It is intended for use by Software and Hardware Engineers in system design.

2.1 SPECIFICATIONS

2.1.1 Electrical Specification

PARAMETER	MIN	TYP	MAX	UNIT
Supply Voltage Vcc	+4.75	+5.00	+5.25	V
Supply Voltage AUX V+ [1]	+11.40	+12.00	+12.60	V
Supply Voltage AUX V- [1]	-12.60	-12.00	-11.40	V
Supply Current Icc [2]	-	-	1660	mA
Supply Current I AUX+ [1]	-	-	-	mA
Supply Current I AUX- [1]	-	-	-	mA

[1] The AUX+ and AUX- voltages are not used on this card but are passed to the feature connector along with Vcc. Refer to the feature card specification, if used, for current drain.

[2] The keyboard, when connected will also draw current on Vcc. Refer to the specification of the keyboard used for current drain.

2.1.2 Mechanical Specification

The 7350 EGA/Keyboard Card meets all general mechanical specifications of the *STD Series 7000 and 70C00 Specifications*, Pro-Log document number 111684. This document is included in the Pro-Log Systems Data Book, document number 107855.

2.1.3 Environmental Specification

PARAMETER	OPERATING			NONOPERATING		UNIT
	MIN	TYP	MAX	MIN	MAX	
Ambient Temp.	0	+25	+65	-40	+75	°C
Humidity	5	-	95[1]	5	95[1]	%RH

[1] Noncondensing

2.1.4 Reliability Specification

The 7350 Mean Time Between Failures is greater than 30 years. The MTBF is calculated using component standard failure rates specified in *MTBF and Failure Rate Calculations*, Pro-Log document number 111443, revision D.

2.1.5 Timing Specification

The 7350 EGA/Keyboard Card meets or exceeds the timing specification of the April 24, 1986 STD Manufacturers Group STD-8088 Bus Specification, revision 2.2, Pro-Log document number 112764.

STD BUS Interface

PIN NUMBER	OUTPUT (LSTTL LOADS)		INPUT (LSTTL LOADS)	PIN NUMBER	OUTPUT (LSTTL LOADS)		INPUT (LSTTL LOADS)	
MNEMONIC								MNEMONIC
+5 VOLTS	IN	-	2	1	-	IN	+5 VOLTS
GROUND	IN	-	4	3	-	IN	GROUND
VBB#2/DCDP	-	–	6	5	-	–	-5V
D7	1	55	8	7	55	1	D3/A19
D6	1	55	10	9	55	1	D2/A18
D5	1	55	12	11	55	1	D1/A17
D4	1	55	14	13	55	1	D0/A16
A15	-	–	16	15	–	-	A7
A14	-	–	18	17	–	-	A6
A13	-	–	20	19	–	-	A5
A12	-	–	22	21	–	-	A4
A11	-	–	24	23	–	-	A3
A10	-	–	26	25	–	-	A2
A9	-	–	28	27	–	-	A1
A8	-	–	30	29	–	-	A0
RD*	-	–	32	31	–	-	WR*
MEMRQ*	-	–	34	33	–	-	IORQ*
MEMEX	-	–	36	35	–	-	IOEXP
MCSYNC*	-	–	38	37	–	-	REFRESH*
STATUS 0*	-	–	40	39	–	-	STATUS 1*
BUSRQ*	-	–	42	41	–	-	BUSAK*
INTRQ*	-	–	44	43	–	-	INTAK*
NMIRQ*	-	–	46	45	–	-	WAITRQ*
PBRESET*	-	–	48	47	–	-	SYSRESET*
CNTRL*	-	–	50	49	–	-	CLOCK*
PCI	IN	–	52	51	–	OUT	PCO
AUX GND	-	–	54	53	–	-	AUX GND
AUX -V	-	–	56	55	–	-	AUX +V

*Designates Active Low-Level Logic

One LSTTL load = .4 mA

2.2 SOFTWARE REFERENCE

2.2.1 7350 Initialization

Video Initialization

To initialize the video driver, execute a FAR CALL to location C0003 hex (C000:0003) in the BIOS extension PROM. This initializes the video circuitry and interrupt vector.

Keyboard Initialization

To initialize the keyboard driver, execute a FAR CALL to location C3803 hex (C000:3803) in the BIOS extension PROM. This initializes the keyboard circuitry and interrupt vectors.

Following are the interrupt vectors that are set after both the video and keyboard drivers have been initialized:

INT. NAME	INT#		TYPE	PURPOSE
	DEC	HEX		
Key Input Int.[1]	9	9	Hardware	Receives key when pressed
Video Services	16	10	Software	Controls the display
Keyboard Int.	22	16	Software	Reads keyboard & status
Extended Func.	6	42	Software	Used by video driver
Char. Table Ptr.	67	43	Software	Pointer to graphics char.

[1] This interrupt must be driven by the IR1* line on the interrupt interconnect connector. Refer to the Hardware Reference, section 2.3.4 for more information.

2.2.2 Video Interrupt, 10 Hex

Video Services

The Video Services Interrupt (10 hex, 16 dec) controls the display in either text or graphics modes. To use this interrupt, set register AH to the desired service code, then set the other registers as required by the particular service, and execute an INT 10 hex.

DESCRIPTION	DEC	HEX
Set Video Mode	0	00
Set Cursor Size	1	01
Set Cursor Position	2	02
Read Cursor Position	3	03
Read Light Pen Position	4	04
Set Active Display Page	5	05
Scroll Window Up	6	06
Scroll Window Down	7	07
Read Character and Attribute	8	08
Write Character and Attribute	9	09
Write Character	10	0A
Set Color Palette	11	0B
Write Pixel Dot	12	0C
Read Pixel Dot	13	0D
Write Character as TTY	14	0E
Get Current Video Mode	15	0F
Set EGA Palette	16	10
Write Character String	19	13

Service 0 (Set Video Mode)

This service sets one of twelve possible video modes.

INPUT	OUTPUT
AH = 00 AL = VIDEO MODE	NO OUTPUT

Video Modes

MODE	TYPE	COLORS	CHARS	PIXELS	RESOLUTION	PAGES
0	TEXT	B/W	40 x 25	N/A	MEDIUM	8
1	TEXT	16	40 x 25	N/A	MEDIUM	8
2	TEXT	B/W	80 x 25	N/A	HIGH	4
3	TEXT	16	80 x 25	N/A	HIGH	4
4	GRAPHIC	4	40 x 25	320 x 200	MEDIUM	N/A
5	GRAPHIC	4 GREY	40 x 25	320 x 200	MEDIUM	N/A
6	GRAPHIC	B/W	80 x 25	640 x 200	HIGH	N/A
7[1]	TEXT	B/W	80 x 25	N/A	HIGH	4
13	GRAPHIC	16	40 x 25	320 x 200	MEDIUM	N/A
14	GRAPHIC	16	80 x 25	640 x 200	HIGH	N/A
15[1]	GRAPHIC	B/W	80 x 25	640 x 350	EXTRA HIGH	N/A
16	GRAPHIC	16 of 64	80 x 25	640 x 350	EXTRA HIGH	N/A

[1] Modes 7 and 15 are for monochrome monitors.

Service 1 (Set Cursor Size)

This service sets the cursor size in horizontal scan lines.

INPUT	OUTPUT
AH = 01 HEX CH = STARTING SCAN LINE CL = ENDING SCAN LINE	NO OUTPUT

Service 2 (Set Cursor Position)

This service positions the cursor to a row and column for the selected display memory page in text mode. The row can be 0 to 24 decimal and the column can be 0 to 39 or 79 decimal.

INPUT	OUTPUT
AH = 02 HEX DH = ROW NUMBER DL = COLUMN NUMBER BH = DISPLAY PAGE[1]	NO OUTPUT

[1] Must be 0 in Graphics Modes

Service 3 (Read Cursor Position)

This service gets the current cursor position from the selected display memory page. The cursor size, in horizonal scan lines is also returned.

INPUT	OUTPUT
AH = 03 HEX BH = DISPLAY PAGE	DH = ROW NUMBER DL = COLUMN NUMBER CH = STARTING SCAN LINE CL = ENDING SCAN LINE

Service 4 (Read Light Pen Position)

The light pen hardware has not been implemented at this time.

Service 5 (Set Active Display Page)

This service sets the currently active video memory display page in text modes. In 40-column modes, the display pages range from 0 to 7. In 80-column modes, the display pages range from 0 to 3.

INPUT	OUTPUT
AH = 05 HEX AL = DISPLAY PAGE	NO OUTPUT

Service 6 (Scroll Window Up)

This service defines and scrolls up a text window on the screen.

INPUT	OUTPUT
AH = 06 HEX AL = # OF LINES [1] TO SCROLLS BH = BACKGROUND [2] ATTRIBUTE CH = TOP ROW CL = LEFT COLUMN DH = BOTTOM ROW DL = RIGHT COLUMN	NO OUTPUT

[1] If AL = 0 then the whole window will be blanked.
[2] Refer to video service 8 for attribute byte definition.

Service 7 (Scroll Window Down)

This service defines and scrolls down a text window on the screen.

INPUT	OUTPUT
AH = 07 HEX AL = # OF LINES [1] TO SCROLLS BH = BACKGROUND [2] ATTRIBUTE CH = TOP ROW CL = LEFT COLUMN DH = BOTTOM ROW DL = RIGHT COLUMN	NO OUTPUT

[1] If AL = 0 then the whole window will be blanked.
[2] Refer to video service 8 for attribute byte definition.

Service 8 (Read Character and Attribute)

This service reads a text character from the selected display memory page. The character's color attribute is also returned.

INPUT	OUTPUT
AH = 08 HEX BH = DISPLAY PAGE	AL = ASCII CHARACTER AH = CHARACTER ATTRIBUTE

Character Attribute

The Character Attribute is a byte that defines the display parameters of the character. Foreground and background color, character brightness, and character blinking are defined with this byte. Setting the corresponding bit to a one enables the component.

BIT 0 = Foreground Blue Component
BIT 1 = Foreground Green Component
BIT 2 = Foreground Red Component
BIT 3 = Character Intensity
BIT 4 = Background Blue Component
BIT 5 = Background Green Component
BIT 6 = Background Red Component
BIT 7 = Character Blinking

NOTE: Up to 16 character colors can be achieved by using different combinations of the red, green, blue, and intensity components.

Service 9 (Write Character and Attribute)

This service writes a text character and attribute to the selected display memory page at the current cursor position. The character count is used to specify the number of times the character will be replicated. The cursor position will not change.

INPUT	OUTPUT
AH = 09 HEX AL = ASCII CHARACTER BH = DISPLAY PAGE BL = ATTRIBUTE [1] CX = CHARACTER COUNT	NO OUTPUT

[1] In graphics modes if bit 7 of the attribute byte is set then the selected foreground color will be exclusively ORed with the current background color. Refer to video service 8 for attribute byte definition.

Service 10 (Write Character)

This service displays a character and is similar to video service 9 except the character attribute remains unchanged.

INPUT	OUTPUT
AH = 0A HEX AL = ASCII CHAR. BH = DISPLAY PAGE BL = COLOR[1] CX = CHAR. COUNT	NO OUTPUT

[1] The color is used only in graphics mode. It can be a value from 0 - 3 that references one of four colors from the color palette. Refer to video service 11 (Set Color Palette) for more information. If bit 7 of the Color (BL) is set, the selected foreground color will be exclusively ORed with the current background color.

Service 11 (Set Color Palette, Mode 4)

This service selects one of the two medium resolution color palettes. Each palette consists of four colors that are defined in the following paragraphs. This service is mainly used in Mode 4 (4-color graphics).

INPUT	OUTPUT
AH = 0B HEX BH = PALETTE CODE BL = PALETTE#/BACK- GROUND COLOR	NO OUTPUT

Palette Code

The Palette Code lets you specify whether you are selecting a color palette or setting the background color. If the palette code (BH) is set to 0, then BL must be set to the desired background color (0 - 15).[1] If the palette code is set to 1, then BL must be set to one of the two color palettes.

[1] In text modes, only the color of the screen border area around the text is set.

Palette 0 - 0 = Current Background Color
1 = Green
2 = Red
3 = Brown

Palette 1 - 0 = Current Background Color
1 = Cyan
2 = Magenta
3 = White

Background Color

See video service 12 (Write Pixel Dot) for color code definitions.

Service 12 (Write Pixel Dot)

This service writes a pixel dot to the screen at a specified pixel row and column. The pixel color is specified with the color code. In graphics modes 4 and 5, the color code should be set to one of the four colors of the currently selected four-color palette (see service 11). In graphics mode 6, the color code should be set to 0 or 1 (black and white). In graphics modes 13, 14, and 16, the color code should be set to one of the 16 color values defined below.

INPUT	OUTPUT
AH = 0C HEX AL = COLOR CODE[1] CX = PIXEL COLUMN DL = PIXEL ROW	NO OUTPUT

Color Values[2]

COLOR	HEX	DEC
BLACK	00	0
BLUE	01	1
GREEN	02	2
CYAN	03	3
RED	04	4
MAGENTA	05	5
BROWN	06	6
LIGHT GREY	07	7
DARK GREY	08	8
LIGHT BLUE	09	9
LIGHT GREEN	0A	10
LIGHT CYAN	0B	11
LIGHT RED	0C	12
LIGHT MAGENTA	0D	13
YELLOW	0E	14
BRIGHT WHITE	0F	15

[1] If bit 7 of the color code is set, the selected color is exclusively ORed with the currently displayed color. Doing this ensures that the dot or character can be seen against the currently displayed color.

[2] These colors are the default colors assigned. Refer to video service 16 for an explanation of how to redefine any or all of these colors.

Service 13 (Read Pixel Dot)

This service reads the pixel color code at the specified row and column.

INPUT	OUTPUT
AH = 0D HEX CX = PIXEL COLUMN DL = PIXEL ROW	AL = COLOR CODE[1]

[1] See service 12 for color code definition.

Service 14 (Write Character as TTY)

This service writes text characters in TTY mode. Service 14 responds to four ASCII control codes:

Beep	^G	07 hex
Backspace	^H	08 hex
Linefeed	^J	0A hex
Carriage Return	^M	0D hex.

INPUT	OUTPUT
AH = 0E HEX AL = ASCII CHARACTER BH = DISPLAY PAGE[1] BL = CHARACTER COLOR[2]	NO OUTPUT

[1] Text modes only.
[2] Graphics modes only.

Service 15 (Get Current Video Mode)

This service gets the currently selected video mode.

INPUT	OUTPUT
AH = 0F HEX	AH = # OF COLUMNS AL = VIDEO MODE [1] BH = DISPLAY PAGE

[1] See video service 0 (Set Video Mode) for mode definition.

Service 16 (Set EGA Palette)

This service defines the 16-color palette. There are four subfunctions (0 - 3). Each color can be individually set or the whole 16-color palette can be redefined. Border color, blinking, and intensity can also be set. The 16 registers of the palette directly correspond to the 16 colors defined in video service 12 (Write Pixel Dot).

INPUT	OUTPUT
AH = 10 HEX AL = SUBFUNCTION (0 - 3) BH = COLOR BYTE[1] BL = REGISTER/BLINK-INTENSITY[2] ES:DX = COLOR LIST OFFSET[3]	NO OUTPUT

[1] Used in Subfunctions 0 and 1 only
[2] Used in Subfunctions 0 and 3 only
[3] Used in Subfunction 2 only

Set EGA Palette Subfunctions:

0 - Sets one of the 16 palette registers to the color byte in BH.

1 - Sets the screen border color to the color byte in BH.

2 - Sets all 16 color registers and the border color of the color palette. ES:DX must point to a 17-byte list of color bytes and border color byte. The first 16 bytes are color bytes that correspond to the 16-color registers and the last byte contains the border color.

3 - Enables the intensity or blink bit. BL must contain the blink or intensity bit. If bit 0 of BL is a 0, intensity is enabled; if bit 0 of BL is a 1, blinking is enabled.

Color Byte:

The color byte consists of six bits of an 8-bit code that defines up to 64 different colors:

BIT 0 = Primary Blue
BIT 1 = Primary Green
BIT 2 = Primary Red
BIT 3 = Secondary Blue
BIT 4 = Secondary Green
BIT 5 = Secondary Red
BIT 6 = Not used, set to 0
BIT 7 = Not used, set to 0

Service 19 (Write Character String)

This service supplies the user with four subfunctions (0 - 3) for displaying character strings.

INPUT	OUTPUT
AH = 13 HEX AL = SUBFUNCTION BH = DISPLAY PAGE BL = CHARACTER ATTRIBUTE[1] DH = CURSOR POS. ROW DL = CURSOR POS. COLUMN CX = STRING LENGTH ES:BP = STRING POINTER	NO OUTPUT

[1] This parameter is used with Subfunctions 0 and 1 only. Refer to video vervice 8 for character attribute definition.

Write Char String Subfunctions:

0 - Displays a character string using the Character Attribute. The cursor remains at the position specified by DH and DL.

1 - Displays a character string using the Character Attribute. The cursor is positioned at the end of the displayed string.

2 - Displays a character string with alternating attribute bytes within the string. The cursor remains at the position specified by DH and DL.

3 - Displays a character string with alternating attribute bytes within the string. The cursor is positioned at the end of the displayed string.

2.2.3 Keyboard Interrupt, 16 Hex

The Keyboard Interrupt (16 hex, 22 dec) is used to read ASCII characters from the keyboard. There are three services for keyboard control available through this interrupt. To use this interrupt, set AH to the desired keyboard service code and execute an INT 16 hex.

Service 0 (Read Next Key Character)

This service returns the next available key chracter. If the keyboard buffer is empty, this service waits until a key is pressed. If the ASCII character returned is equal to 0, the scan code contains a code for any special keys pressed.

INPUT	OUTPUT
AH = 00 HEX	AH = SCAN CODE AL = ASCII CHARACTER

SCAN CODES for Special Keys

KEY	HEX	DEC
F1	36	59
F2	37	60
F3	38	61
F4	39	62
F5	3A	63
F6	3B	64
F7	3C	65
F8	3D	66
F9	3E	67
F10	3F	68
SHIFT F1	54	84
SHIFT F2	55	85
SHIFT F3	56	86
SHIFT F4	57	87
SHIFT F5	58	88
SHIFT F6	59	89
SHIFT F7	5A	90
SHIFT F8	5B	91
SHIFT F9	5C	92
SHIFT F10	5D	93
CTRL F1	5E	94
CTRL F2	5F	95
CTRL F3	60	96
CTRL F4	61	97
CTRL F5	62	98
CTRL F6	63	99
CTRL F7	64	100
CTRL F8	65	101
CTRL F9	66	102
CTRL F10	67	103
ALT F1	68	104
ALT F2	69	105
ALT F3	6A	106
ALT F4	6B	107
ALT F5	6C	108
ALT F6	6D	109
ALT F7	6E	110
ALT F8	6F	111
ALT F9	70	112
ALT F10	71	113
ALT 1	78	120
ALT 2	79	121
ALT 3	7A	122
ALT 4	7B	123
ALT 5	7C	124
ALT 6	7D	125
ALT 7	7E	126
ALT 8	7F	127

KEY	HEX	DEC
ALT 9	80	128
ALT 0	81	129
ALT -	82	130
ALT =	83	131
ALT Q	10	16
ALT W	11	17
ALT E	12	18
ALT R	13	19
ALT T	14	20
ALT Y	15	21
ALT U	16	22
ALT I	17	23
ALT O	18	24
ALT P	19	25
ALT A	1E	30
ALT S	1F	31
ALT D	20	32
ALT F	21	33
ALT G	22	34
ALT H	23	35
ALT J	24	36
ALT K	25	37
ALT L	26	38
ALT Z	2C	44
ALT X	2D	45
ALT C	2E	46
ALT V	2F	47
ALT B	30	48
ALT N	31	49
ALT M	32	50
SHIFT TAB	0F	15
HOME	47	71
UP ARROW	48	72
PgUp	49	73
L ARROW	4B	75
R ARROW	4D	77
END	4F	79
DN ARROW	50	80
PgDn	51	81
INSERT	52	82
DELETE	53	83
CTRL PrtSc	72	114
CTRL L ARROW	73	115
CTRL R ARROW	74	116
CTRL END	75	117
CTRL PgDn	76	118
CTRL HOME	77	119
CTRL PgUp	84	132

Service 1 (Test Character Ready)

This service reports whether a character is ready to be read or not. The scan code and ASCII character is returned if available. Repeated calls to this service always return the same character. You must perform a keyboard service 0 to flush the character from the buffer.

INPUT	OUTPUT
AH = 01 HEX	ZF (ZERO FLAG)[1] AH = SCAN CODE AL = ASCII CHARACTER

[1] If ZF = 0 then the ASCII character and scan codes are valid.
If ZF = 1 then there is no character available.

Service 2 (Get Shift Status)

This service returns a status byte with the shift key and locking key states.

INPUT	OUTPUT
AH = 02 HEX	AL = SHIFT STATUS BYTE

Shift Status Byte

SHIFT STATUS BYTE	
BIT 0	Right Shift Key Pressed
BIT 1	Left Shift Key Pressed
BIT 2	Ctrl Key Pressed
BIT 3	Alt Key Pressed
BIT 4	Scroll Lock On
BIT 5	Num Lock On
BIT 6	Caps lock On
BIT 7	Insert State On

2.2.4 BIOS Memory Requirements

The 7350 card's BIOS extension requires some low system memory to operate. RAM memory within the absolute address range of 00400 hex to 004FF hex must be available for use by the 7350 card's BIOS extension.

NOTE: In an STD-DOS system, this is the system RAM area.

2.3 HARDWARE REFERENCE

2.3.1 Hardware Description

The 7350 uses the Paradise Enhanced Graphics Adapter chip (PEGA 1A), which is a fully integrated video controller. This card also features a BIOS extension, an IBM-compatible feature connector, an IBM-compatible keyboard interface, and 256K of onboard video memory.

2.3.2 Monitor Interface, J2

The 7350 Card interfaces to a Color, Enhanced Color, or Monochrome monitor through an onboard 9-pin D connector.

Monitor Interface Pin Description

PIN #	DESCRIPTION
1	GROUND
2	GND/SECONDARY RED[1]
3	RED
4	GREEN
5	BLUE
6	SECONDARY GREEN
7	SECONDARY BLUE
8	HORIZONTAL SYNC
9	VERTICAL SYNC

[1] Pin 2 reflects the state of the Enhanced Display jumper.

2.3.3 Keyboard Interface, J3

The Keyboard Interface connector is a 10-pin latching connector that interfaces to a 5-pin DIN connector to use an IBM-compatible keyboard.

Keyboard Interface

PIN #	DESCRIPTION	PIN #	DESCRIPTION
1	NO CONNECTION	2	KBDCLK
3	GROUND	4	NO CONNECTION
5	NO CONNECTION	6	KBDDATA
7	VCC	8	NO CONNECTION
9	NO CONNECTION	10	RESET*

* Designates Active Low-Level Logic

2.3.4 Interrupt Interconnect, J4

An Interrupt Interconnect interface is supplied with two interrupt control lines to be used by the CPU.

PIN #	DESCRIPTION
1	IR2*
2	IR1*

IR1* - This signal is generated by the keyboard circuitry to cause the CPU to interrupt when a key is pressed.

IR2* - This signal is generated by the video circuitry to cause the CPU to interrupt at the vertical retrace time.

* Designates Active Low-Level Logic

2.3.5 Feature Connector, J1

The Feature Connector is an IBM-compatible interface on the card that accommodates any IBM feature boards.

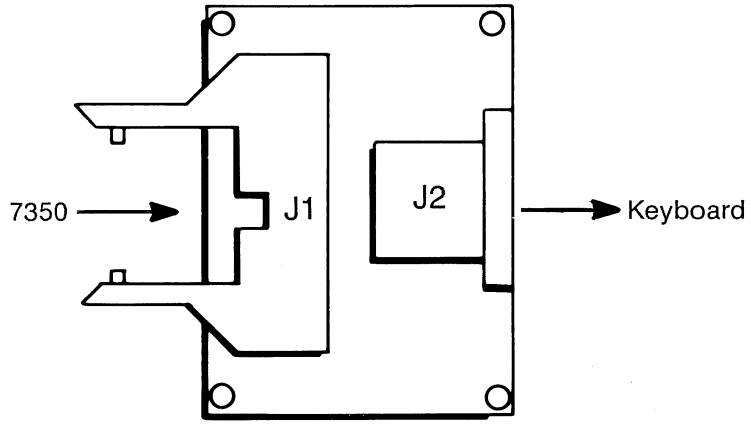
Feature Connector Pin Description

PIN #	DESCRIPTION	PIN #	DESCRIPTION
1	GROUND	2	-12 VOLTS
3	+12 VOLTS	4	VIDEO to E1
5	EXT. VIDEO to E2	6	J3-6
7	J3-2	8	J3-7
9	ATRSLN*	10	J3-5
11	J3-4	12	GREEN
13	SRED	14	BLUE
15	RED	16	J3-3
17	FEAT1	18	BLANK
19	FEAT0	20	FC1
21	FC0	22	SGREEN
23	SBLUE	24	HSYNC
25	VSYNC	26	14MHZ
27	INTERN*	28	EXTOSC
29	J3-9	30	J3-8
31	GROUND	32	VCC

* Designates Active Low-Level Logic

2.3.6 DIN Interface Adapter

This adapter is used to interface an IBM PC compatible keyboard to the 7350 EGA/Keyboard Interface card.



KBDCLK	J1 Pin 9 - J2 Pin 1
KBDDATA	J1 Pin 5 - J2 Pin 2
RESET*	J1 Pin 1 - J2 Pin 3
GND	J1 Pin 8 - J2 Pin 4
Vcc	J1 Pin 4 - J2 Pin 5

2.3.7 Port Mapping

PEGA 1A Port Range

The PEGA 1A Controller chip ports are mapped within the range of 3B0 hex to 3DF hex. Refer to Paradise Systems Inc. Application Note Number 38304 for port and register descriptions to directly program the PEGA 1A video controller chip.

Keyboard Port Range

The 7350 keyboard interface ports are mapped from 060 hex to 063 hex.

2.3.8 Video Memory

The 7350 Card has 256K of video memory. Portions of this memory are dynamically mapped between the absolute addresses of A0000 and BFFFF, depending upon the currently selected video mode. In text modes, the ASCII character and its attribute byte are alternately stored for each displayed character. In graphics modes, the pixels are bit mapped.

2.3.9 BIOS extension PROM

The 7350 EGA/Keyboard Card has a BIOS extension PROM that contains all the software needed to control this card. The 16K PROM is mapped at address C0000 hex and contains video and keyboard drivers. Refer to *Software Reference*, Section 2.2, for more information.

2.3.10 7350 Reference Drawings

The schematic and assembly drawing in the following pages are included FOR REFERENCE ONLY. The drawings may differ in some respects from the card you receive from Pro-Log. If you require the specific revision documents of the schematic and assembly for the board shipped, please call Pro-Log Customer Support at (800) 538-9570 from 7:30 a.m. to 4:30 p.m. (Pacific Time).

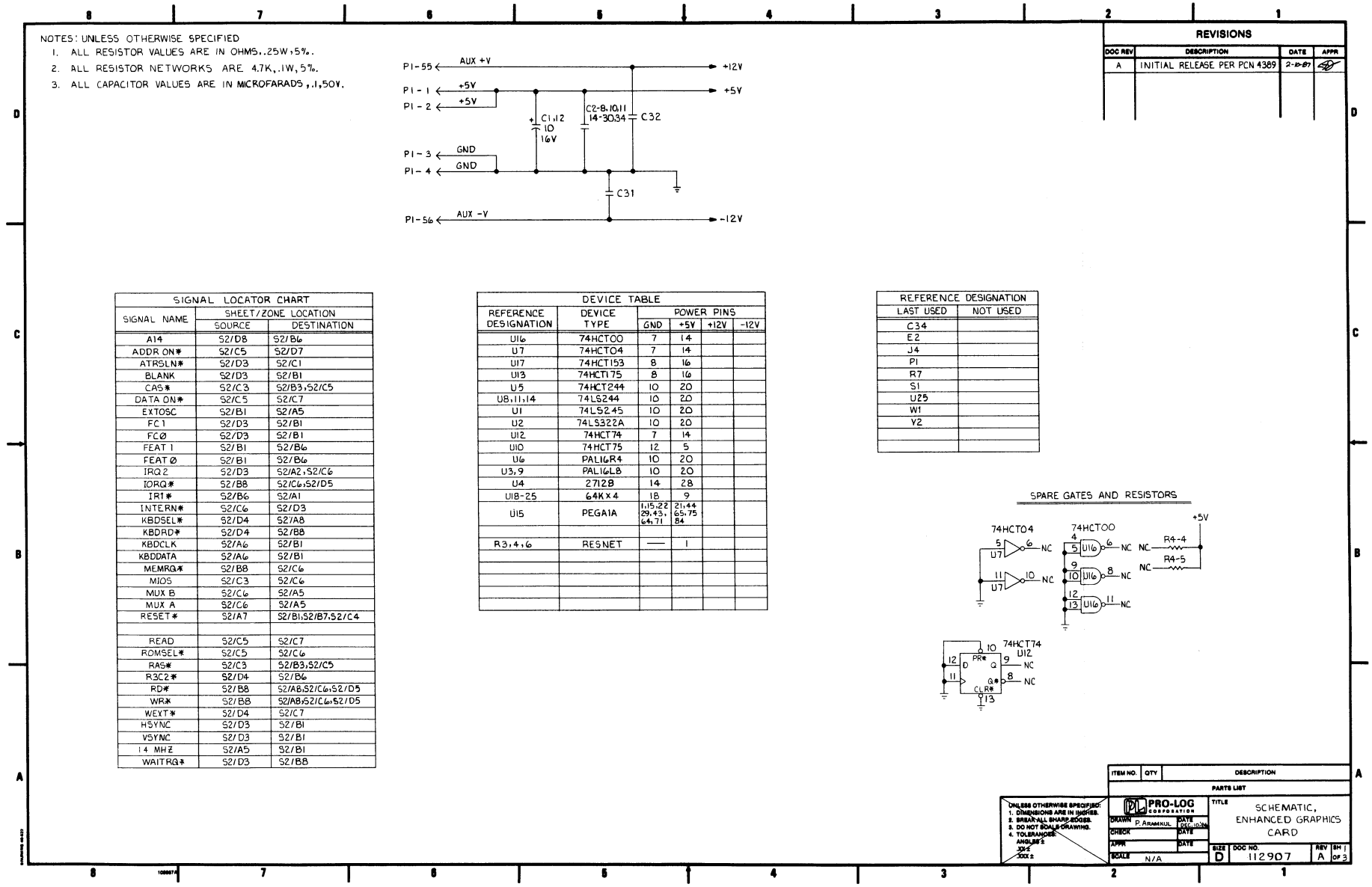


Figure 2-1. Schematic (Page 1 of 3)
FOR REFERENCE ONLY

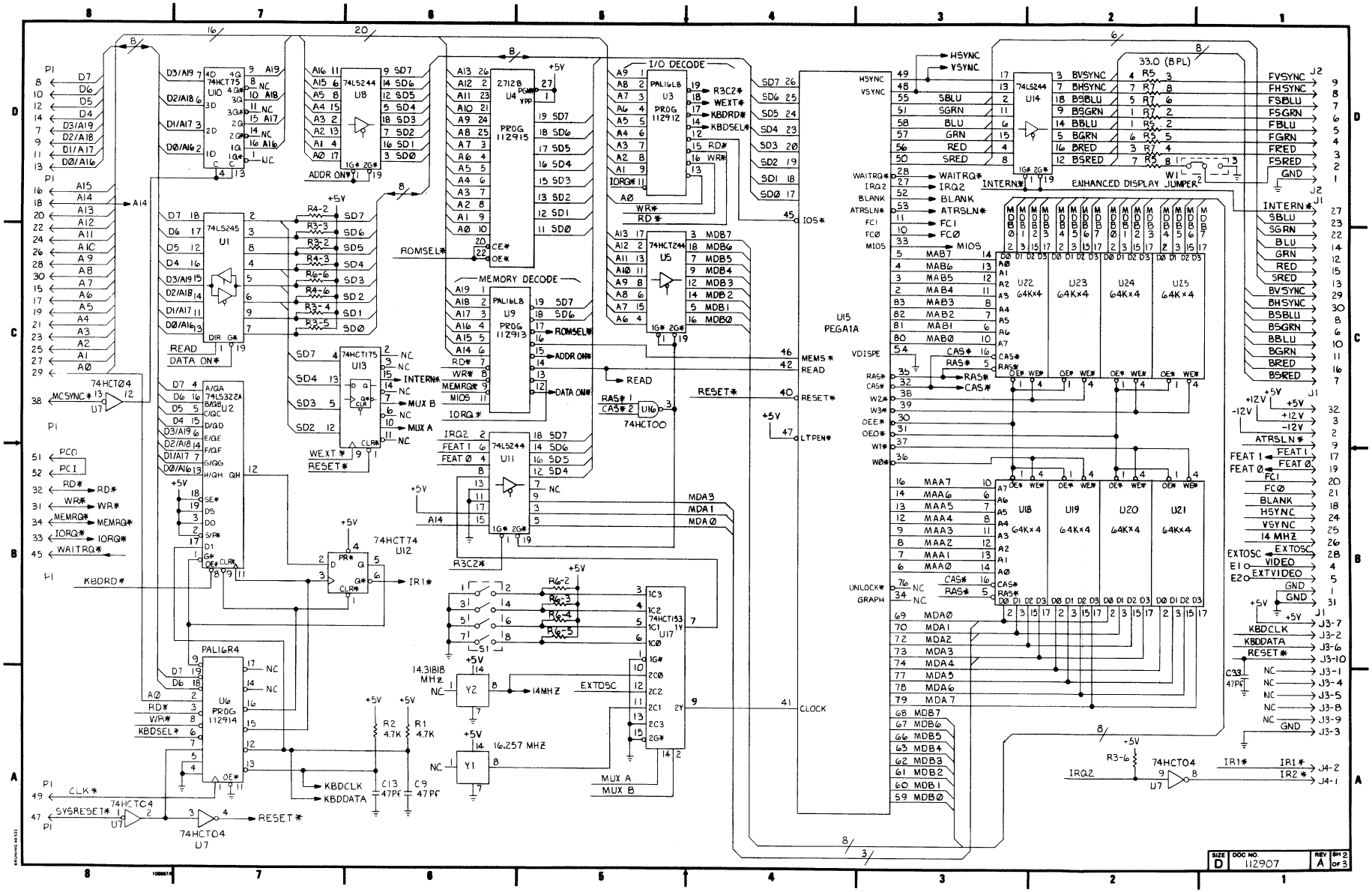


Figure 2-1. Schematic (Page 2 of 3)
FOR REFERENCE ONLY

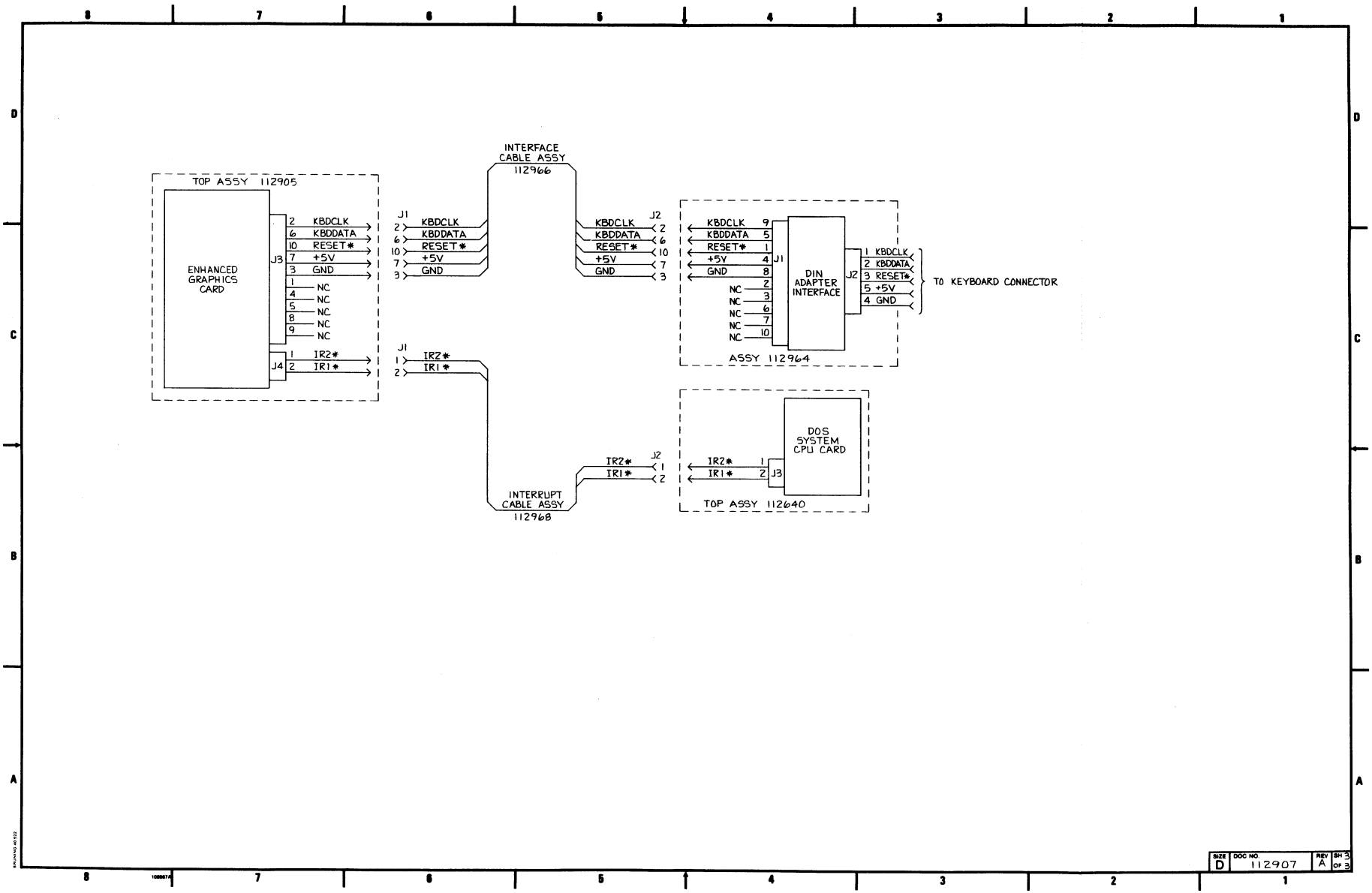


Figure 2-1. Schematic (Page 3 of 3)
FOR REFERENCE ONLY

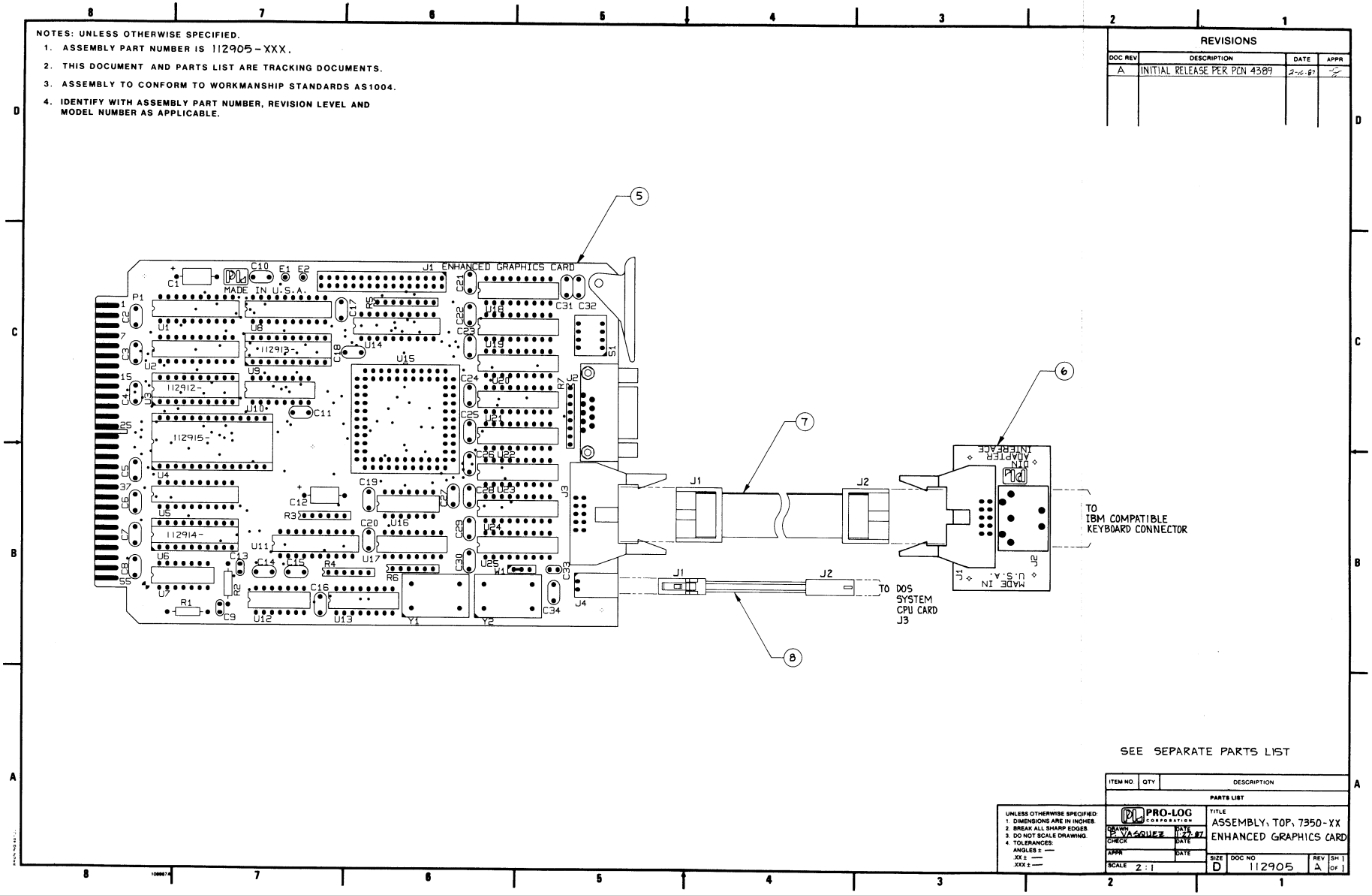

NOTES: UNLESS OTHERWISE SPECIFIED.
1. ASSEMBLY PART NUMBER IS 112905-XXX.
2. THIS DOCUMENT AND PARTS LIST ARE TRACKING DOCUMENTS.
3. ASSEMBLY TO CONFORM TO WORKMANSHIP STANDARDS AS1004.
4. IDENTIFY WITH ASSEMBLY PART NUMBER, REVISION LEVEL AND MODEL NUMBER AS APPLICABLE.
REVISIONS
DOC REV | DESCRIPTION | DATE | APPR
A | INITIAL RELEASE PER PCN 4389 | 2-16-87
J1 ENHANCED GRAPHICS CARD
MADE IN U.S.A.
112913-
112912-
112915-
112914-
TO IBM COMPATIBLE KEYBOARD CONNECTOR
TO DOS SYSTEM CPU CARD J3
SEE SEPARATE PARTS LIST
ITEM NO | QTY | DESCRIPTION
PARTS LIST
PRO-LOG CORPORATION
TITLE
ASSEMBLY, TOP, 7350-XX
ENHANCED GRAPHICS CARD
DRAWN P. VASQUEZ 1-27-87
CHECK
APPR
SCALE 2:1
SIZE D | DOC NO 112905 | REV A | SH 1 OF 1
UNLESS OTHERWISE SPECIFIED:
1. DIMENSIONS ARE IN INCHES.
2. BREAK ALL SHARP EDGES.
3. DO NOT SCALE DRAWING.
4. TOLERANCES:
ANGLES ± —
XX ± —
XXX ± —

Figure 2-2. Assembly Drawing
FOR REFERENCE ONLY